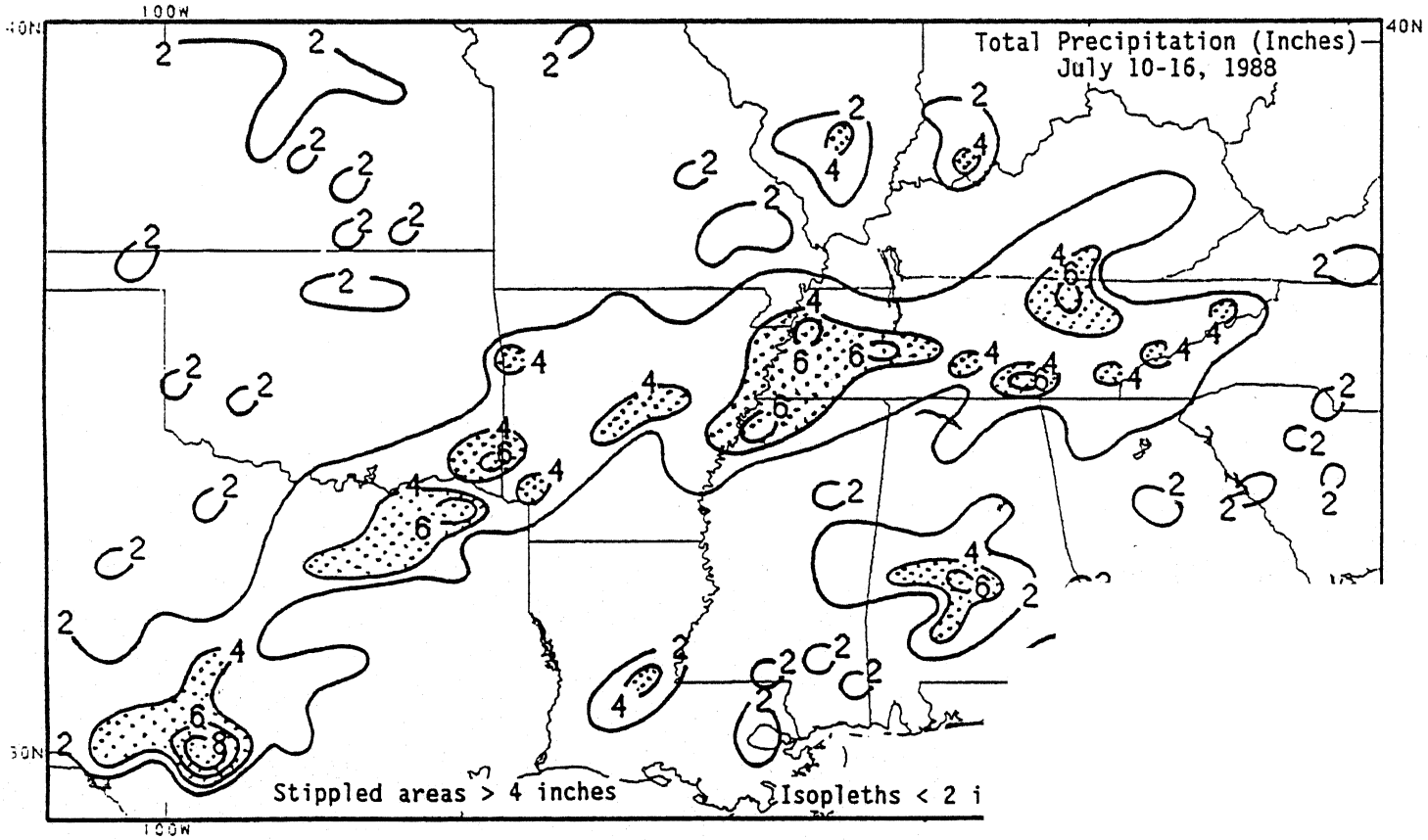
CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

No. 88/29 Washington, DC July 16, 1988



A BAND OF THUNDERSTORMS DROPPED HEAVY RAINS (UP TO 14.8 I
TEXAS) FROM THE SOUTHERN GREAT PLAINS NORTHEASTWARD INTO
PROVIDING SOME RELIEF TO THE LATTER AREA'S ABNORMALLY DRY

NOAA - NATIONAL WEATHER SERVICE - NATIONAL MI

WEEKLY CLIMATE BULLETIN

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This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief, concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

Highlights of major global climatic events and anomalies.
U.S. climatic conditions for the previous week.
U.S. apparent temperatures (summer) or wind chill (winter).
Global two-week temperature anomalies.
Global four-week precipitation anomalies.
Global monthly temperature and precipitation anomalies.
Global three-month precipitation anomalies (once a month).
Global twelve-month precipitation anomalies (every 3 months).
Global temperature anomalies for winter and summer seasons.
Special climate summaries, explanations, etc. (as appropriate).

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Center via the Global Telecommunication System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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Phone: (301)-763-8071

GLOBAL HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF JULY 16, 1988
(Approximate duration of anomalies is in brackets.)

1. United States and South Central Canada:
WARM, DRY CONDITIONS PERSIST.
Abnormally warm conditions persisted in the northern states with temperatures as much as 4.8°C (8.6°F) above normal. Most stations in the central and eastern United States reported less than 13.5 mm (0.53 inch) of precipitation; however, some stations from central Texas northeastward into the Tennessee Valley received substantial amounts of precipitation. See U.S. Weekly Weather Highlights for additional details [18 weeks dry - 11 weeks warm].

2. Kazakh S.S.R.:
VERY WARM CONDITIONS PREVAIL.
Unusually high temperatures occurred across much of the Kazakh S.S.R. and adjacent Soviet Socialist Republics and were as much as 10.7°C (19.3°F) above normal [9 weeks].

3. Europe and North Africa:
EXTENSIVE AREA REMAINS VERY WARM.
Temperatures averaged up to 6.6°C (11.9°F) above normal as anomalously warm weather persisted across most of Europe and northern Africa [3 weeks].

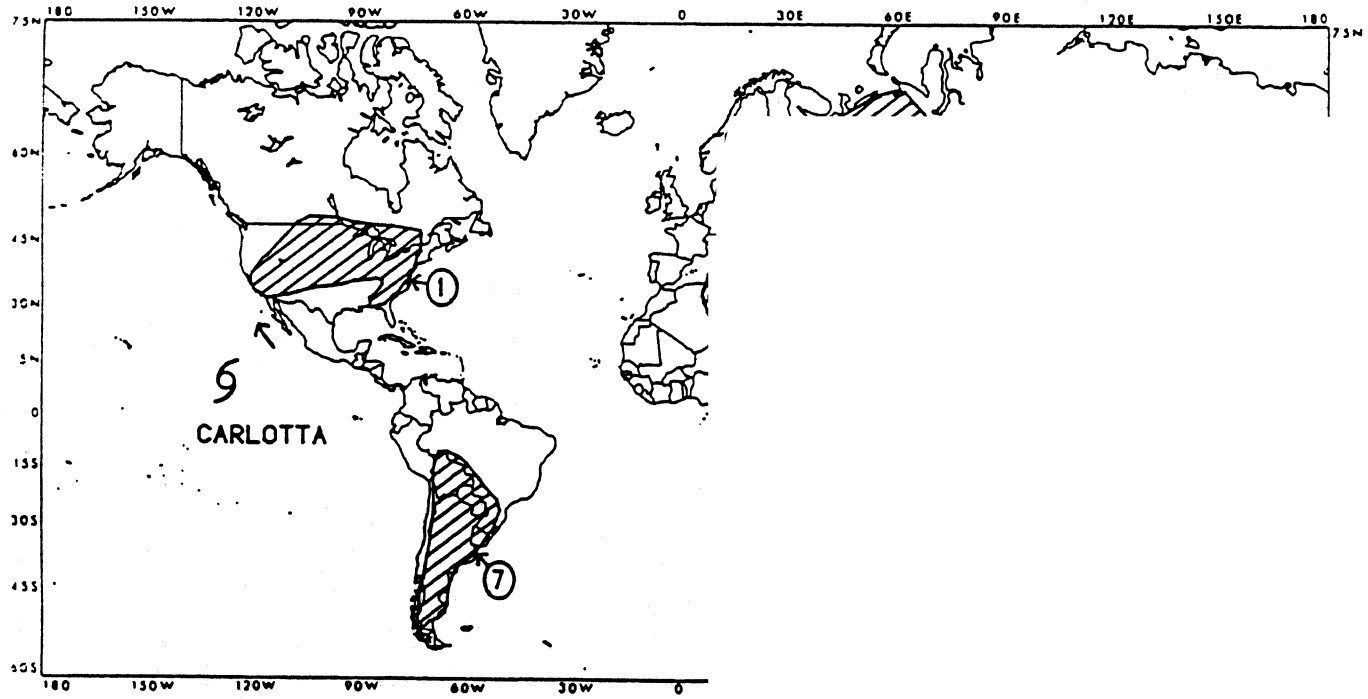
4. Western India:
RAINS CONTINUE; DRYNESS ENDS.
As much as 156.0 mm (6.14 inches) of rain fell at stations in western India [Ended at 8 weeks].

5. East Central China:
VERY HOT AND DRY IN REGION.
Light precipitation, generally less than 21.6 mm (0.85 inch), along with very high temperatures, up to 4.5°C (8.1°F) above normal, occurred across parts of eastern China [6 weeks dry - 3 weeks warm].

6. Bangladesh and Northeastern India:
MONSOON RAINS DIMINISH.
Light precipitation, 27.9 mm (1.10 inches) or less, fell in the region as monsoon rain intensity decreased [Ending at 5 weeks].

7. South America:
LOW TEMPERATURES RETURN.
Very cold conditions, with temperatures as much as 8.1°C (14.6°F) below normal, returned to extensive areas of South America from Bolivia to Argentina [2 weeks].

8. South Africa:
UNUSUAL SNOWSTORM REPORTED.
Extremely cold weather caused unusual snowfalls in the Drakensburg Range of Natal Province in eastern South Africa. The press reported that travelers were stranded and electrical power was lost at some locations [Episodal Event].



Approximate locations of the major anomalies this map. See the other world maps in this i anomalies, four-week precipitation anomalies,

U.S. WEEKLY WEATHER HIGHLIGHTS

FOR THE WEEK OF JULY 10 THROUGH JULY 16, 1988

In contrast to the abnormally dry weather of the past eighteen weeks, a vast majority of the eastern half of the nation received precipitation, some of it very heavy, from south-central Texas northeastward through the Tennessee Valley and into southwestern Virginia (see front cover). According to the River Forecast Center, amounts exceeding ten inches (maximum of 14.8 in) were reported northwest of San Antonio, TX, while 4-6 inches were common in extreme northeastern Texas. Farther east, Arkansas (5.2 in), the Missouri bootheel (3.9 in), western Kentucky (4.3 in), the southern tips of Illinois (5.7 in) and Indiana (4.6 in), Tennessee (6.4 in), parts of northern and central Mississippi (8.3 in) and Alabama (6.8 in), western North Carolina (4.6 in), and southwestern Virginia (3.9 in) measured substantial rainfall (parentheses contain maximum state totals). Elsewhere, thunderstorms, at times severe, dropped significant precipitation on portions of southeastern North Dakota, northeastern South Dakota, central Minnesota, and central Wisconsin, across northern Nebraska and central Iowa, throughout much of lower Michigan and northern Indiana, at scattered locations in eastern Pennsylvania, central New York, and northern Maine, and in central Florida (see Table 1). The badly-needed precipitation provided some temporary relief from the drought in the eastern half of the U.S., but much more rainfall is required to erase long-term deficiencies. Light to moderate amounts occurred along the Pacific Northwest Coast and the extreme northern Rockies, and in most of the country east of the Rockies. Little or no precipitation was observed in the southern half of the Pacific Coast and throughout the Intermountain region, and in sections of central Nebraska, central Oklahoma, the Texas panhandle, central Illinois, and along the Texas Gulf Coast.

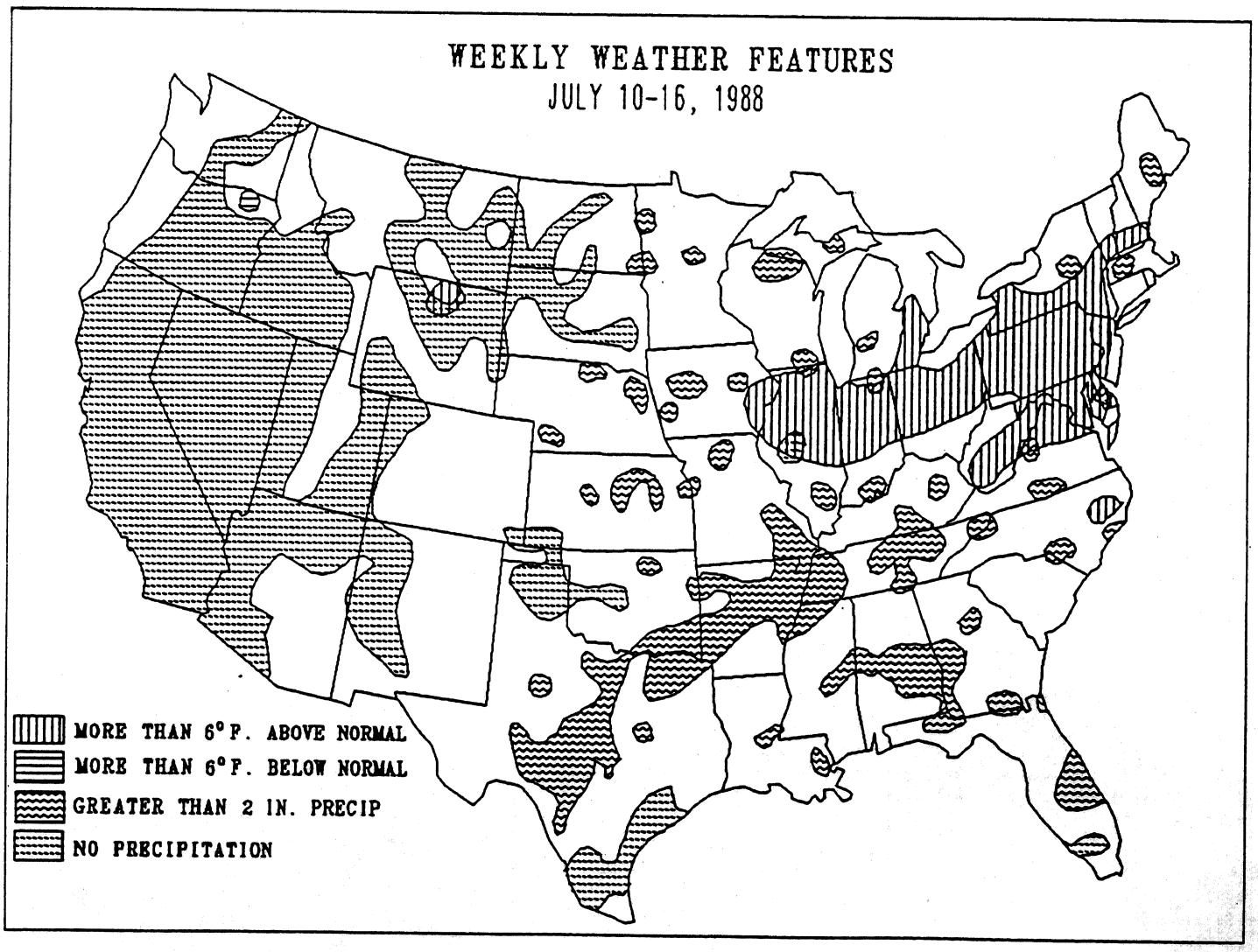
Above normal temperatures continued to dominate much of the U.S. last week as departures of +6 to +9°F prevailed across the middle Mississippi Valley, Ohio Valley, mid-Atlantic, New England, and central Alaska regions (see Table 2). Other areas, such as the central Rockies, northern half of the Great Plains, the Southeast, and most of Alaska and Hawaii averaged about 2-4°F above normal. Highs in the one hundreds (up to 107°F at Martinsburg, WV) frequented the Ohio Valley and mid-Atlantic during the week as dozens of stations established new record daily maximum temperatures. In addition, readings topped the century mark in the central Great Plains, but cooler air from Canada brought some respite from the heat towards the end of the week. Slightly below normal temperatures were found from southern California northward into the Pacific Northwest, in the southern Rockies and western half of Texas, extreme southeastern Alaska, and along the Canadian border from Montana eastward to Lake Superior.

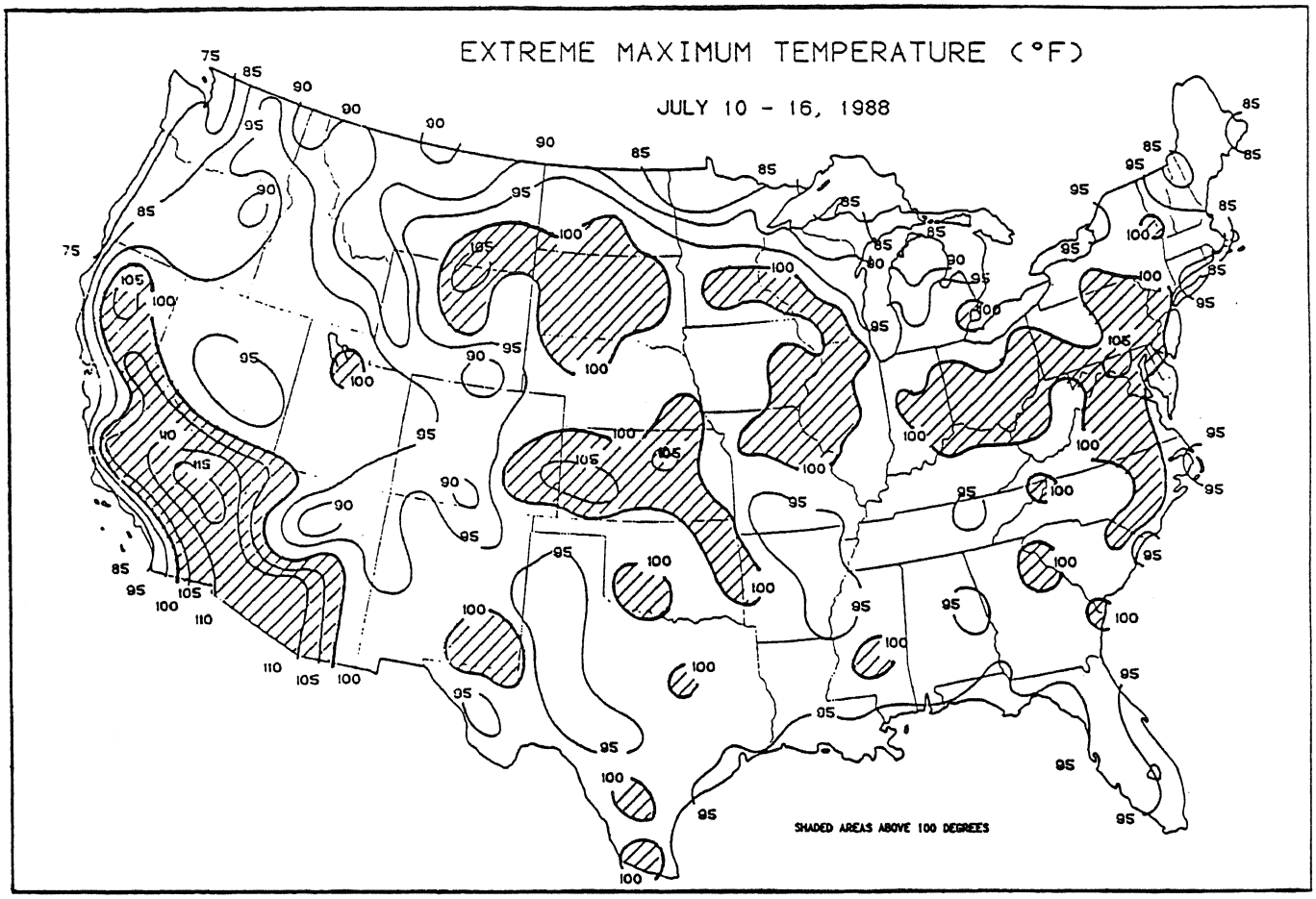
TABLE 1. Selected stations with more than two inches of precipitation for the week.

Montgomery, AL	5.93	Meridian NAS, MS	2.56
Little Rock AFB, AR (LRF)	5.36	Dallas NAS, TX (NBE)	2.51
Dallas/Love Field, TX (DAL)	5.17	Key West, FL	2.47
Jackson, TN	4.65	New Orleans/Moisant, LA	2.44
Blytheville AFB, AR	4.57	Norfolk, NE	2.41
Memphis NAS, TN (NQA)	4.20	Valdosta, GA	2.37
Little Rock, AR (IMI)	3.73	Vero Beach, FL	2.34
Jacksonville, FL (JAX)	3.70	Jacksonville/New Ri, NC	2.32
Orlando, FL	3.55	Park Falls, WI	2.27
Crossville, TN	3.51	Rockford, IL	2.22
Jonesboro, AR	3.05	Omaha/Offutt AFB, NE	2.20
Grand Rapids, MI	2.80	Valparaiso, FL	2.19
Memphis, TN (MEM)	2.77	Rome/Griffiss AFB, NY	2.13
Columbus/Ft. Benning, GA	2.70	Jacksonville NAS, FL (NIP)	2.10
Dothan, AL	2.62	Sawyer AFB, MI	2.10
Nashville, TN	2.59	Yakutat, AK	2.09

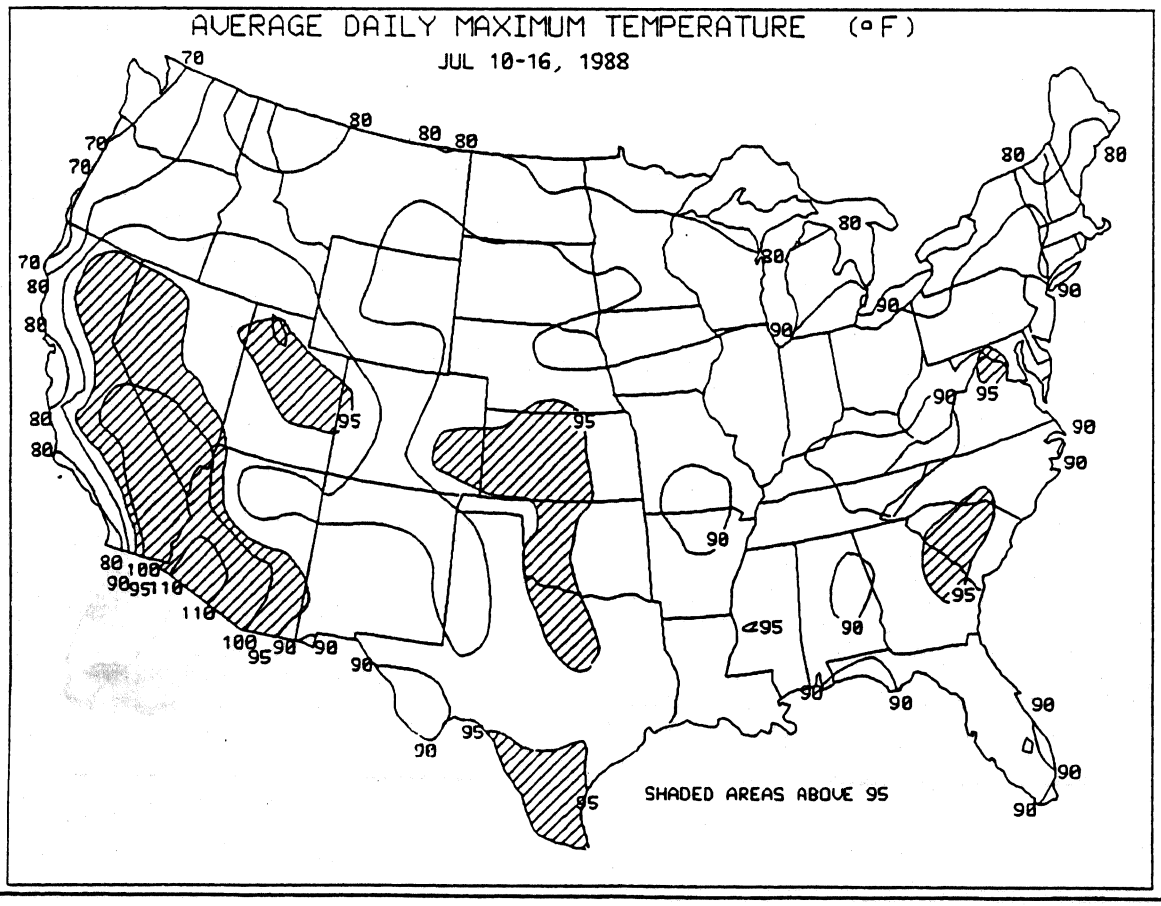
TABLE 2. Selected stations with temperatures averaging greater than 6°F ABOVE normal for the week.

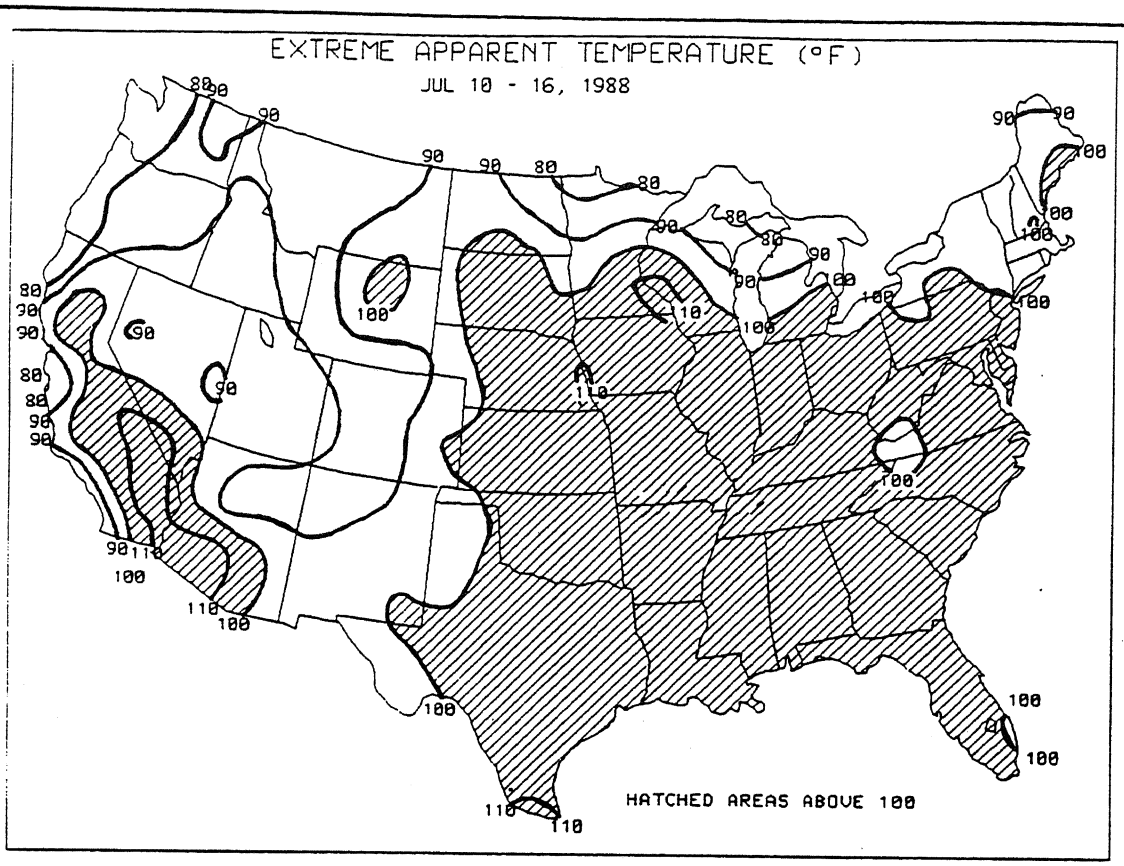
Station	TDepNml	AvgT(°F)	Station	TDepNml	AvgT(°F)
Pittsburgh, PA	+9	81	Burlington, IA	+7	83
Martinsburg, WV	+8	83	Wilmington, DE	+7	83
Williamsport, PA	+8	81	Washington/Dulles, VA	+7	82
Wilkes-Barre, PA	+8	80	Charleston, WV	+7	82
Cleveland, OH	+8	80	Dayton, OH	+7	82
Altoona, PA	+8	79	Indianapolis, IN	+7	82
Youngstown, OH	+8	78	Peoria, IL	+7	82
Binghamton, NY	+8	77	Moline, IL	+7	82
Bradford, PA	+8	73	Columbus, OH	+7	81
Fairbanks, AK	+8	70	Allentown, PA	+7	81
McGrath, AK	+8	67	Chicago/O'Hare, IL	+7	80
Wainwright, AK	+8	51	Detroit, MI	+7	80
Seymour-Johnson AFB, NC	+7	87	Findlay, OH	+7	80
Washington/National, DC	+7	86	Akron, OH	+7	79
St. Louis, MO	+7	86	Toledo, OH	+7	79
Baltimore, MD	+7	84	Worland, WY	+7	79
Philadelphia, PA	+7	84	Erie, PA	+7	77
Newark, NJ	+7	84	Flint, MI	+7	77
Dover AFB, DE	+7	84	Portland, ME	+7	75
Harrisburg, PA	+7	83	Bettles, AK	+7	67



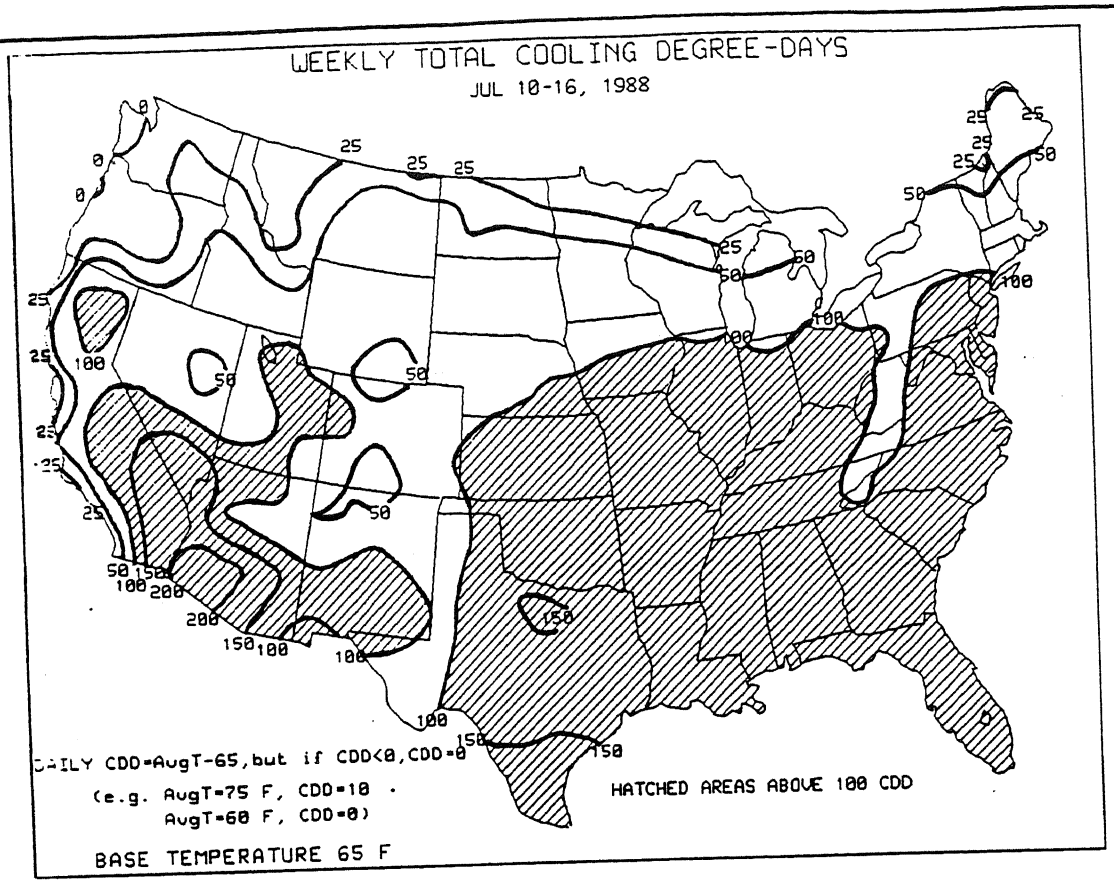


Highs surpassed the 100°F mark in the desert Southwest, California interior, central Great Plains, Midwest, and mid-Atlantic regions as unseasonably hot weather continued to afflict much of the country (top), while maximum temperatures averaged over 95°F in parts of the central and eastern U.S. (below).

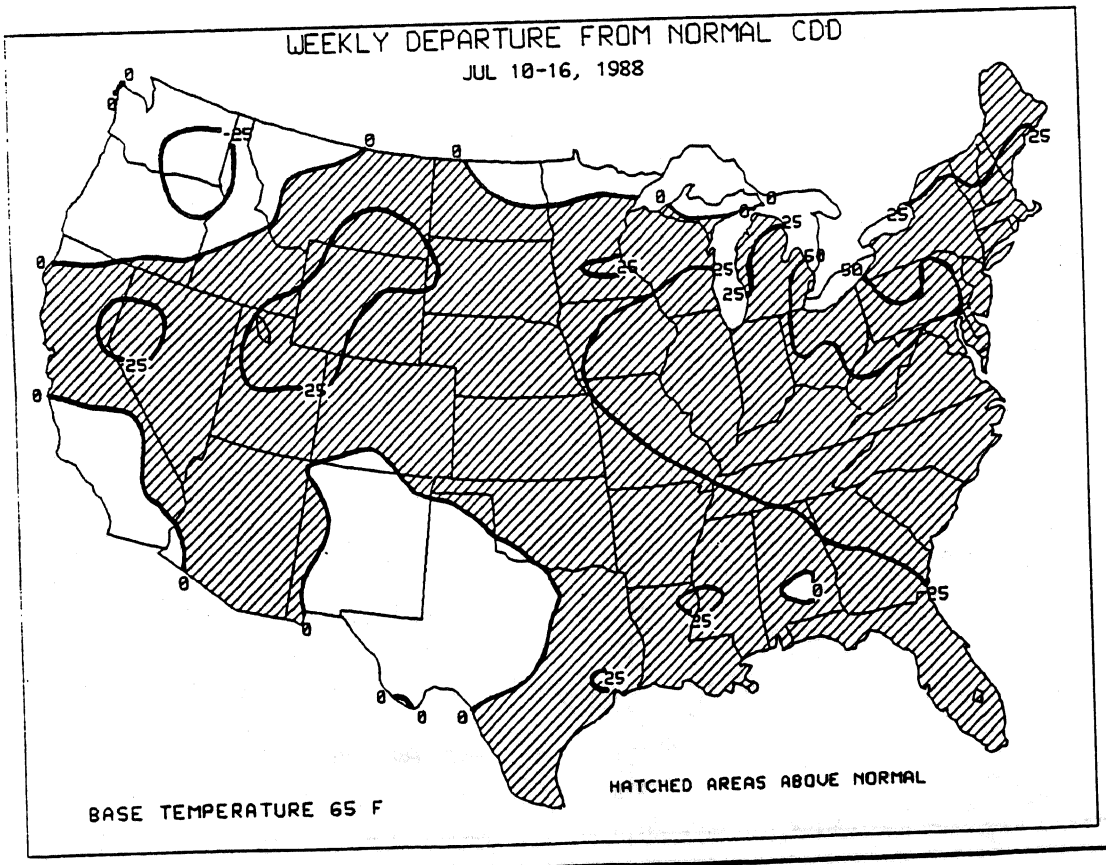




Most of the eastern half of the nation sweltered as apparent temperatures exceeded 100°F at least once last week (top), while areas in Texas and the South Atlantic experienced average maximum apparent temperatures over 100°F (below).

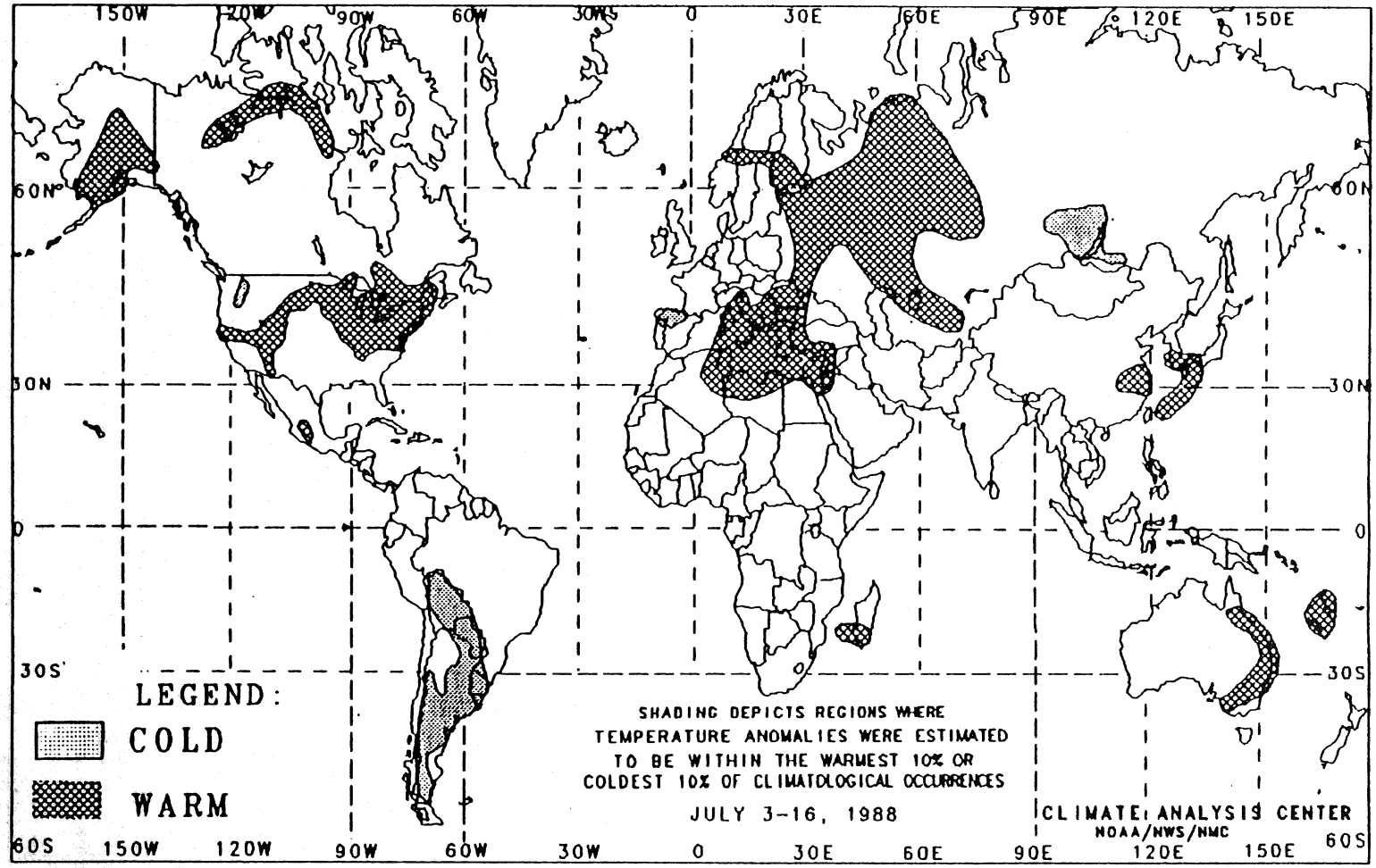


Well above normal weekly temperatures across most of the United States increased the normal demand for air conditioning (CDD), especially parts of the Ohio Valley and mid-Atlantic as they experienced CDD departures of more than +50.



GLOBAL TEMPERATURE ANOMALIES

2 Week



The anomalies on this chart
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Temperature anomalies are not
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based on approximately 2500
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This in turn may have
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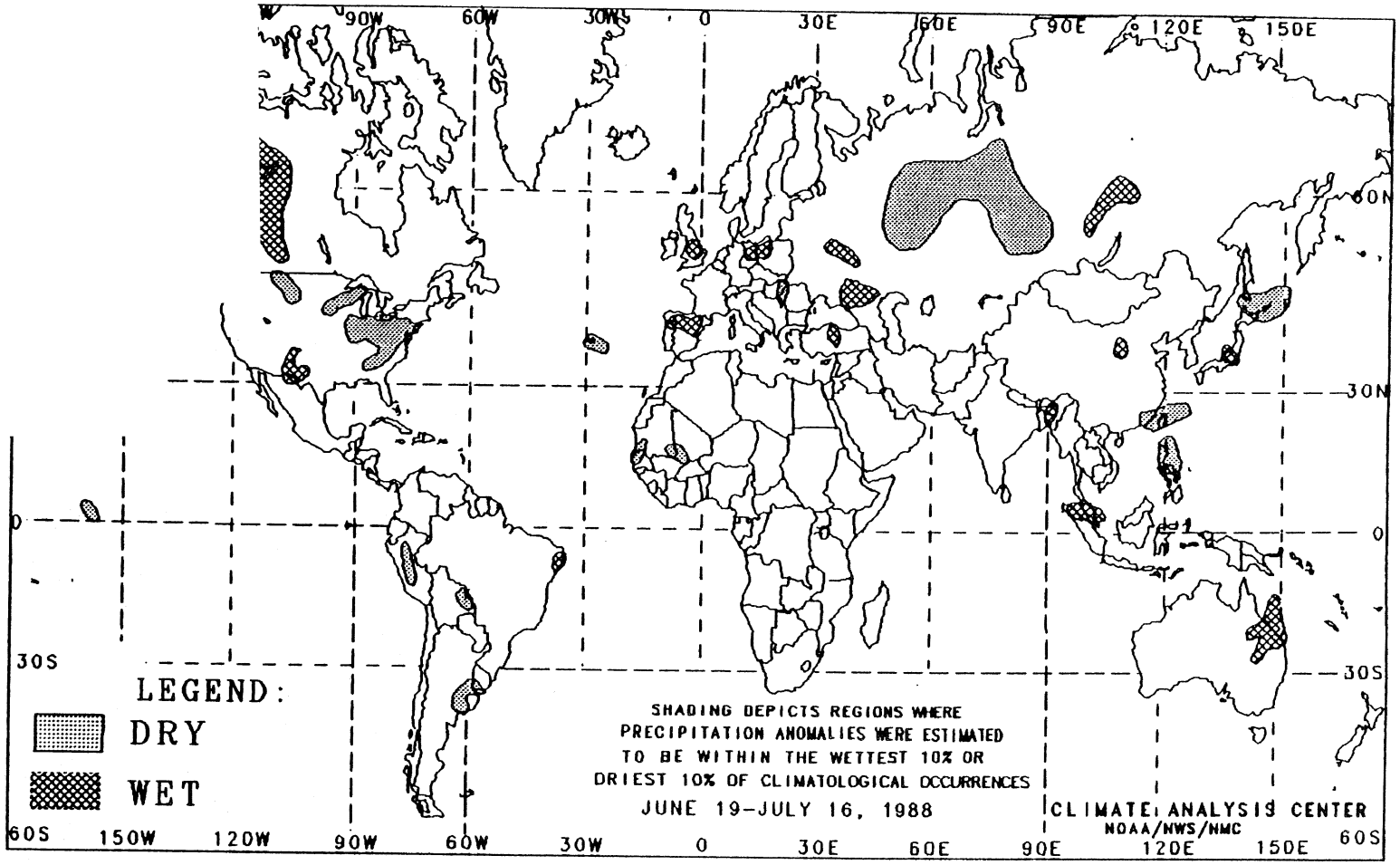
°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining precentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

GLOBAL PRECIPITATION ANOMALIES

4 Week



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

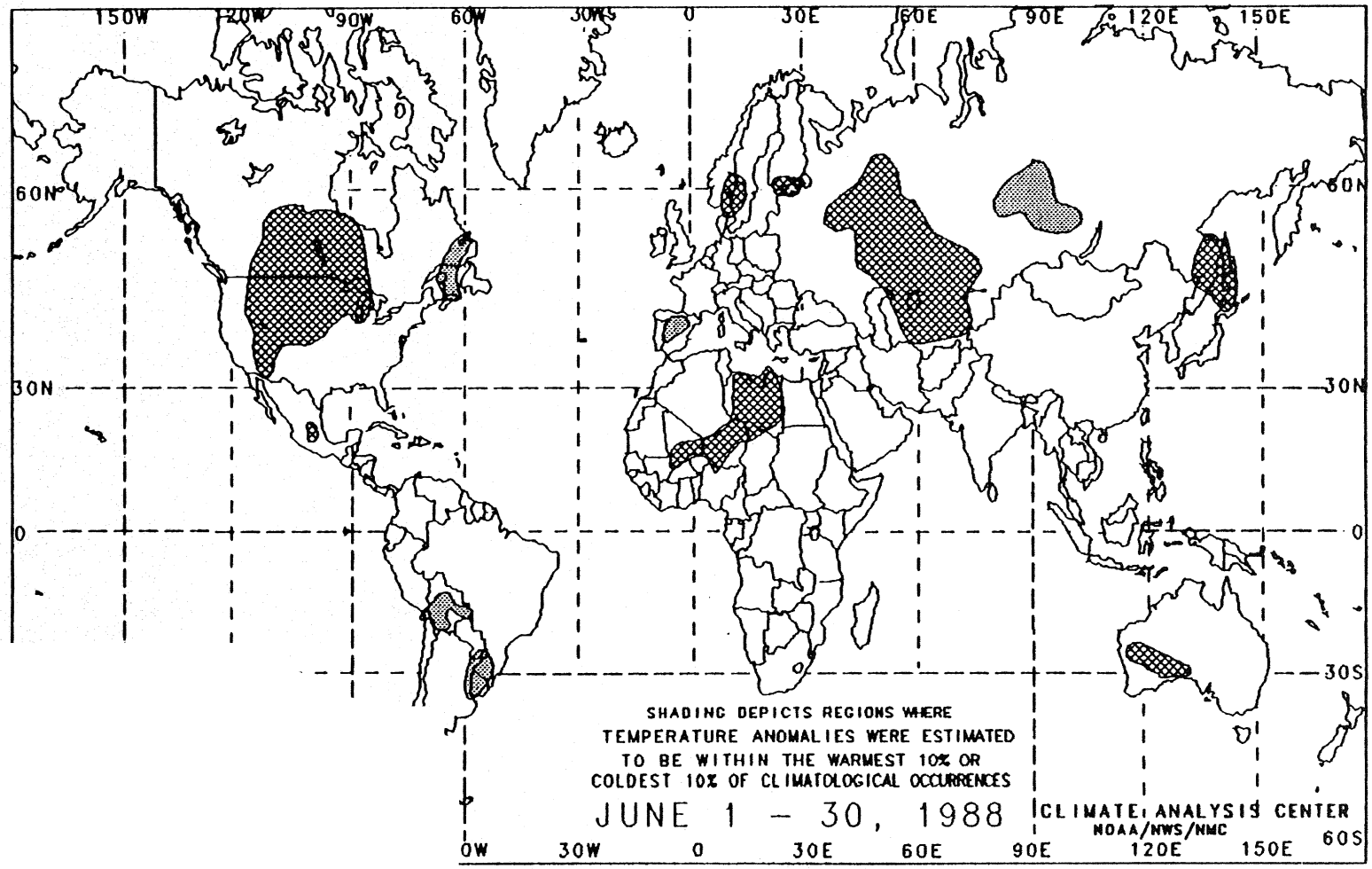
In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

GLOBAL TEMPERATURE ANOMALIES

Monthly



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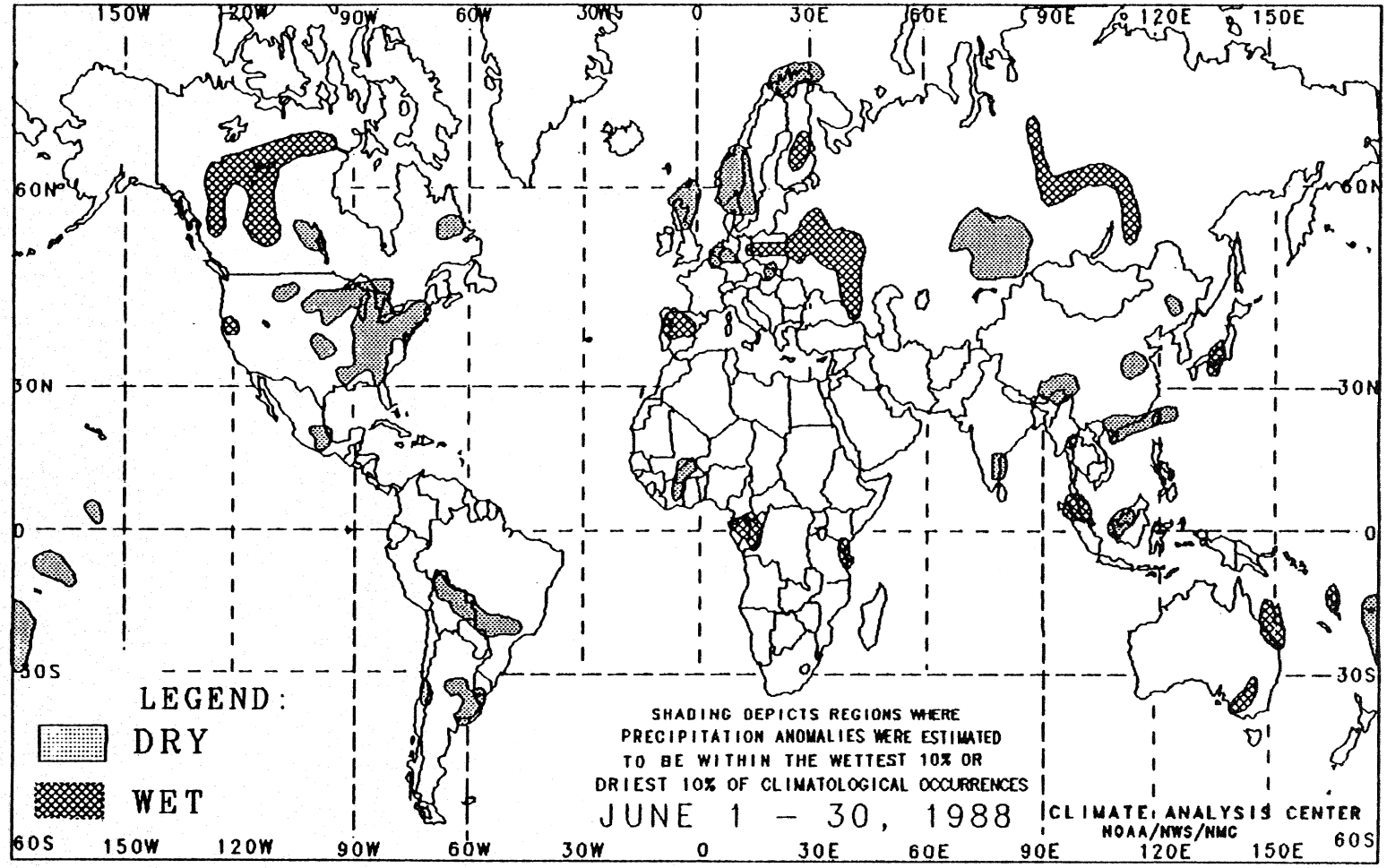
The chart shows general areas of one month temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

PRINCIPAL TEMPERATURE ANOMALIES - JUNE 1988

REGIONS AFFECTED	TEMPERATURE AVERAGE (C)	DEPARTURE FROM NORMAL (C)	COMMENTS
NORTH CENTRAL UNITED STATES AND SOUTH CENTRAL CANADA	+14 TO +34	+2 TO +7	WARM - 4 TO 26 WEEKS
EXTREME SOUTHEASTERN CANADA	+9 TO +14	-2 TO -3	VERY COLD EARLY AND LATE IN JUNE
CENTRAL MEXICO	AROUND +22	AROUND +2	VERY WARM EARLY IN JUNE
BOLIVIA	+2 TO +22	-2 TO -4	VERY COLD FIRST HALF OF JUNE
URUGUAY, EXTREME NORTHEASTERN ARGENTINA, AND EXTREME SOUTHERN BRAZIL	+10 TO +15	-2 TO -4	VERY COLD FIRST HALF OF JUNE
SOUTHERN ARGENTINA	+3 TO +9	+2 TO +4	VERY MILD SECOND HALF OF JUNE
SOUTHEASTERN NORWAY AND SOUTHWESTERN SWEDEN	+15 TO +19	+2 TO +5	MILD - 6 WEEKS
SOUTHERN FINLAND	+16 TO +17	+2 TO +4	MILD - 8 TO 9 WEEKS
SPAIN	+13 TO +22	-2 TO -4	COOL - 5 WEEKS
NORTH CENTRAL AFRICA	+28 TO +36	+2 TO +4	WARM - 11 TO 14 WEEKS
SOUTHWESTERN SOVIET UNION	+13 TO +30	+2 TO +8	WARM - 4 TO 5 WEEKS
SOUTH CENTRAL SIBERIA	+8 TO +13	-2 TO -5	COLD - 4 TO 8 WEEKS
EXTREME SOUTHEASTERN SIBERIA	+13 TO +21	+2 TO +3	WARM - 5 WEEKS
SOUTHWESTERN AUSTRALIA	+14 TO +16	AROUND +2	WARM - 5 WEEKS

GLOBAL PRECIPITATION ANOMALIES

Monthly



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In climatologically arid regions where normal precipitation for the one month period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total one month precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of one month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

PRINCIPAL PRECIPITATION ANOMALIES - JUNE 1988

REGIONS AFFECTED	PRECIPITATION TOTAL (MM)	PERCENT OF NORMAL	COMMENTS
WEST CENTRAL CANADA	46 TO 247	182 TO 474	WET - 5 TO 26 WEEKS
WEST CENTRAL MANITOBA AND EAST CENTRAL SASKATCHEWAN	15 TO 42	26 TO 46	DRY - 4 TO 13 WEEKS
NORTHERN NEWFOUNDLAND AND EAST CENTRAL QUEBEC	18 TO 34	28 TO 47	DRY - 4 TO 6 WEEKS
NORTHERN CALIFORNIA	44 TO 66	218 TO 486	WET - 11 WEEKS
SOUTHERN MONTANA	11 TO 31	21 TO 43	DRY - 4 TO 26 WEEKS
SOUTHWESTERN KANSAS AND NORTHEASTERN OKLAHOMA	2 TO 48	3 TO 39	DRY - 5 TO 13 WEEKS
CENTRAL AND EASTERN UNITED STATES AND ADJACENT CANADA	1 TO 62	1 TO 58	DRY - 5 TO 26 WEEKS
CENTRAL MEXICO	0 TO 118	0 TO 64	DRY - 4 WEEKS
CHRISTMAS ISLAND	0 TO 6	0 TO 2	DRY - 7 TO 16 WEEKS
COOK ISLANDS	48 TO 73	38 TO 41	DRY - 17 WEEKS
FIJI ISLANDS	3 TO 66	4 TO 42	DRY - 5 TO 18 WEEKS
NORTHERN BOLIVIA AND WEST CENTRAL BRAZIL	0 TO 18	0 TO 13	DRY - 4 TO 26 WEEKS
CENTRAL CHILE	5 TO 86	7 TO 44	DRY - 26 WEEKS
ARGENTINA AND URUGUAY	0 TO 68	0 TO 48	DRY - 4 TO 13 WEEKS
SCOTLAND	18 TO 26	16 TO 39	DRY - 4 TO 18 WEEKS
NORTHERN NORWAY	4 TO 26	9 TO 32	DRY - 5 TO 21 WEEKS
SOUTHWESTERN SWEDEN AND SOUTHERN NORWAY	12 TO 33	19 TO 47	DRY - 5 TO 11 WEEKS
CENTRAL FINLAND	93 TO 94	167 TO 177	HEAVY PRECIPITATION EARLY AND LATE IN JUNE
BENELUX COUNTRIES AND WEST GERMANY	4 TO 49	7 TO 48	DRY - 4 TO 14 WEEKS

REGIONS AFFECTED	PRECIPITATION TOTAL (MM)	PERCENT OF NORMAL	COMMENTS
EASTERN CZECHOSLOVAKIA AND SOUTH CENTRAL POLAND	38 TO 62	34 TO 47	DRY - 6 TO 6 WEEKS
SPAIN AND PORTUGAL	68 TO 212	207 TO 769	WET - 5 TO 12 WEEKS
CENTRAL POLAND AND SOUTHERN EUROPEAN SOVIET UNION	93 TO 266	168 TO 443	WET - 4 TO 9 WEEKS
CENTRAL SAHEL REGION	4 TO 78	7 TO 61	DRY - 7 TO 23 WEEKS
GABON AND CONGO	241 TO 766	338 TO 6417	HEAVY PRECIPITATION LATE IN JUNE
SOUTHERN KENYA AND NORTHEASTERN TANZANIA	79 TO 238	228 TO 383	WET - 5 TO 8 WEEKS
KAZAKH S.S.R.	1 TO 66	3 TO 68	DRY - 4 TO 26 WEEKS
CENTRAL SIBERIA	72 TO 218	163 TO 319	WET - 4 TO 6 WEEKS
NORTHEASTERN CHINA	2 TO 64	3 TO 49	DRY - 4 TO 6 WEEKS
SOUTHWESTERN CHINA AND ADJACENT PARTS OF INDIA	2 TO 211	3 TO 49	DRY - 6 TO 16 WEEKS
EAST CENTRAL CHINA	2 TO 37	3 TO 48	DRY - 4 TO 26 WEEKS
SOUTHEASTERN CHINA AND TAIWAN	48 TO 226	16 TO 49	DRY - 5 TO 6 WEEKS
CENTRAL JAPAN	234 TO 696	163 TO 391	HEAVY PRECIPITATION EARLY AND LATE IN JUNE
NORTHWESTERN THAILAND	323 TO 418	211 TO 249	WET - 4 TO 5 WEEKS
SOUTHEASTERN INDIA	3 TO 49	6 TO 48	DRY - 5 TO 26 WEEKS
SOUTHERN MALAYSIA AND NORTHERN SUMATRA	224 TO 328	174 TO 289	WET - 5 TO 6 WEEKS
WESTERN BORNEO	122 TO 127	46 TO 62	DRY - 6 WEEKS
VANUATU ISLANDS	632 TO 646	248 TO 319	WET - 6 WEEKS
NORTHEASTERN AUSTRALIA	161 TO 197	289 TO 481	WET - 4 TO 8 WEEKS
SOUTHEASTERN AUSTRALIA	62 TO 79	198 TO 244	HEAVY PRECIPITATION MIDDLE OF JUNE

EXPLANATION OF THE 3-MONTH PERCENTAGE PROBABILITY PROJECTIONS OF THE PALMER DROUGHT INDEX (PDI).

The probabilities are obtained by running the Palmer Drought Index (at the end of the month) for each state's climate divisions three months ahead using the monthly weather scenarios (temperature and precipitation) of all the past years since and including 1931. For example, to obtain the September, 1988 PDI projections, the historical monthly weather data for July, August, and September, 1931 are used as input together with the PDI value at the end of June, 1988. Based upon the three months historical data, a new PDI is computed for the end of September, 1988. The same calculations are then repeated for each year up to and including 1987 (57 years), producing up to 57 new PDI values. The probability in percent for a given category is the number of times the projected PDI fell in a given drought category (see Table 1) divided by the number of years since 1931 times 100. This procedure is done for all the climate divisions in every state except Alaska and Hawaii. A selected category's (e.g. PDI less than -3.0) values are then automatically contoured and plotted as shown in Figures 1-3.

Based upon the PDI at the end of June, 1988 and historical weather data since 1931, the projections for the end of September, 1988 suggests that many areas of the U.S. will likely be experiencing moderate drought or worse (PDI less than -2.0) (see Figure 1), while parts of the northern Great Plains, Midwest, Tennessee Valley, and Far West may be afflicted with severe or extreme drought (PDI less than -3.0) (see Figure 2). Few regions are projected to be in a very moist spell (greater than +3.0) or wetter as depicted in Figure 3. For a brief description of the Palmer Drought Index, refer to the Weekly Climate Bulletin dated March 26, 1988 (No. 88/13).

Table 1. The PDI values for the seven categories used in the percentage calculations.

Extreme or Severe Drought	- Less than or equal -3.0
Moderate Drought	- Greater than -3.0 & less than or equal -2.0
Mild Drought	- Greater than -2.0 & less than or equal -1.0
Near Normal or Incipient Conditions	- Greater than -1.0 & less than +1.0
Moist Spell	- Greater than or equal +1.0 & less than +2.0
Unusual Moist Spell	- Greater than or equal +2.0 & less than +3.0
Very or Extreme Moist Spell	- Greater than or equal +3.0

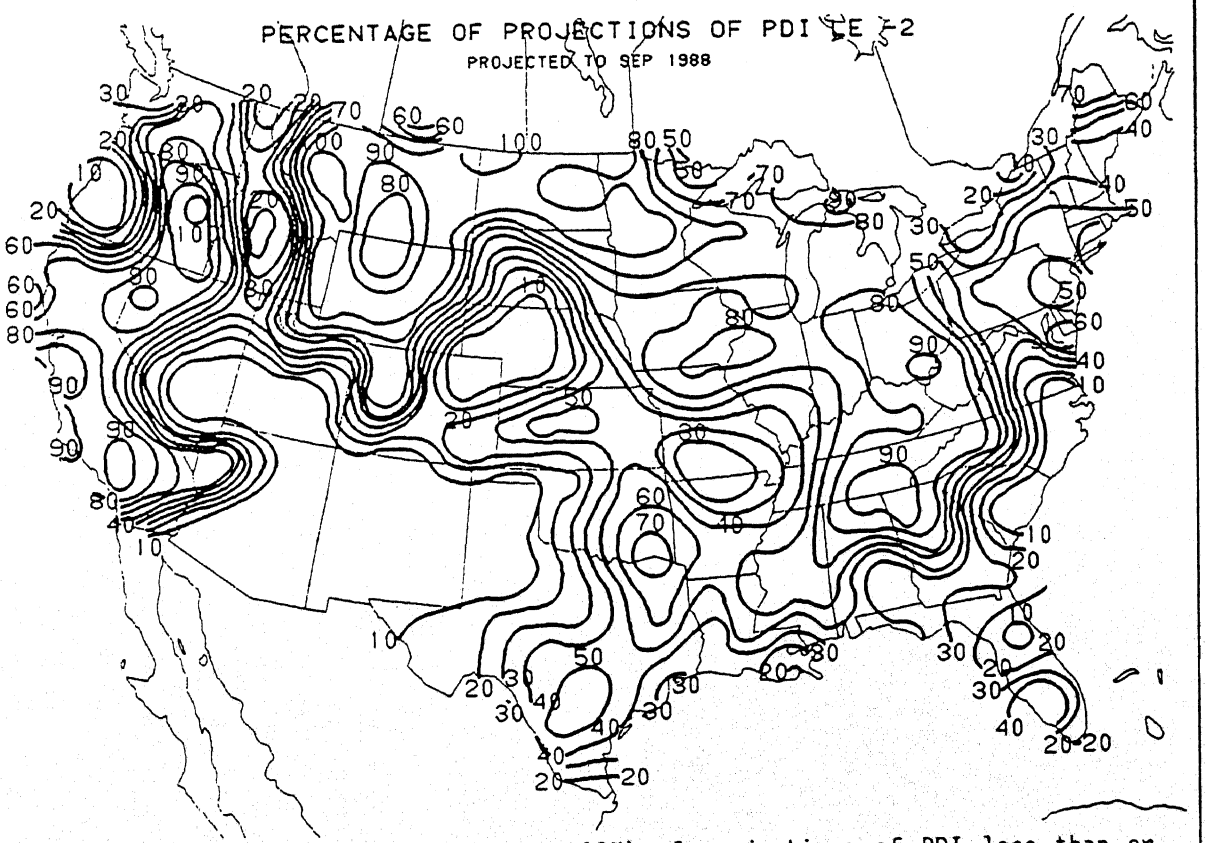

Figure 1. Percentage (contoured every 10%) of projections of PDI less than or equal to -2.0 (projected to the end of September, 1988). Based upon current PDI values (at the end of June, 1988) and historical data since 1931, much of the country may experience moderate drought or worse by the end of September, 1988.

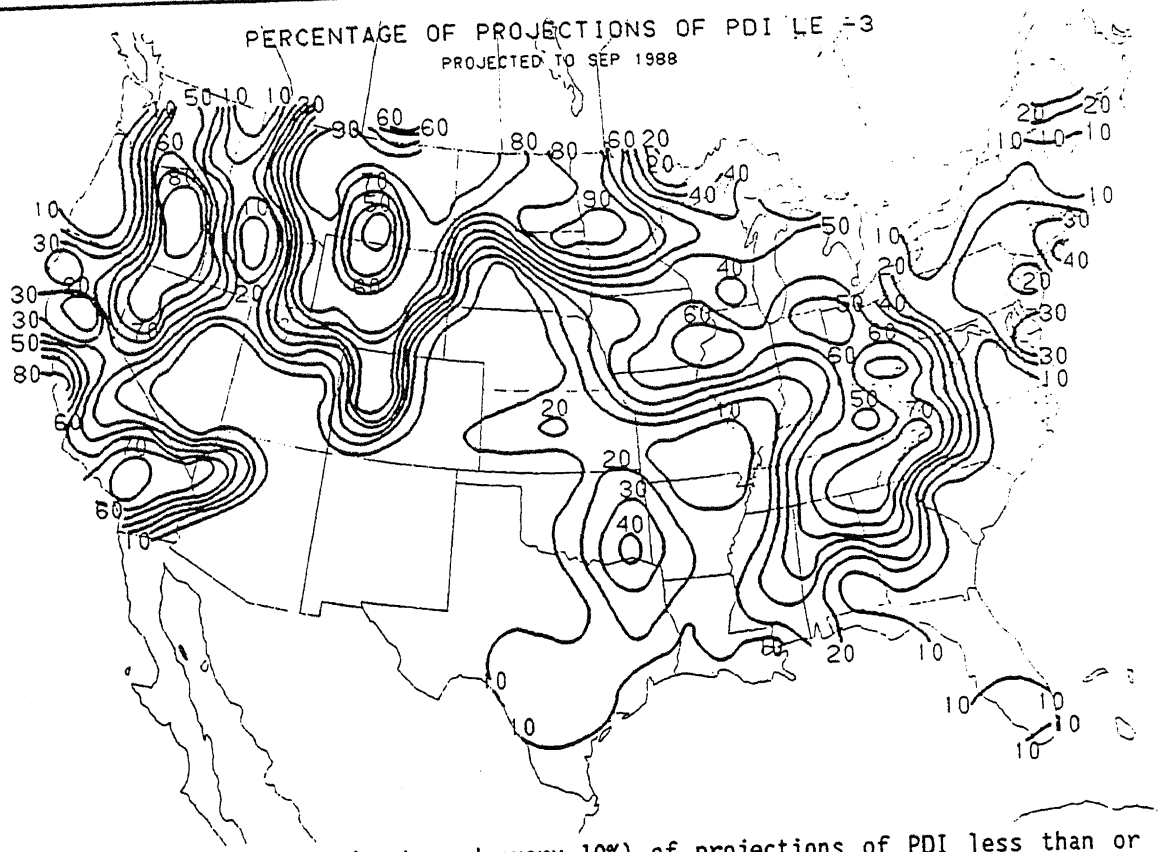

Figure 2. Percentage (contoured every 10%) of projections of PDI less than or equal to -3.0 (projected to the end of September, 1988). Severe or extreme drought may be likely for parts of the northern Great Plains, Midwest, Tennessee Valley, and Far West based upon current and previous weather conditions.

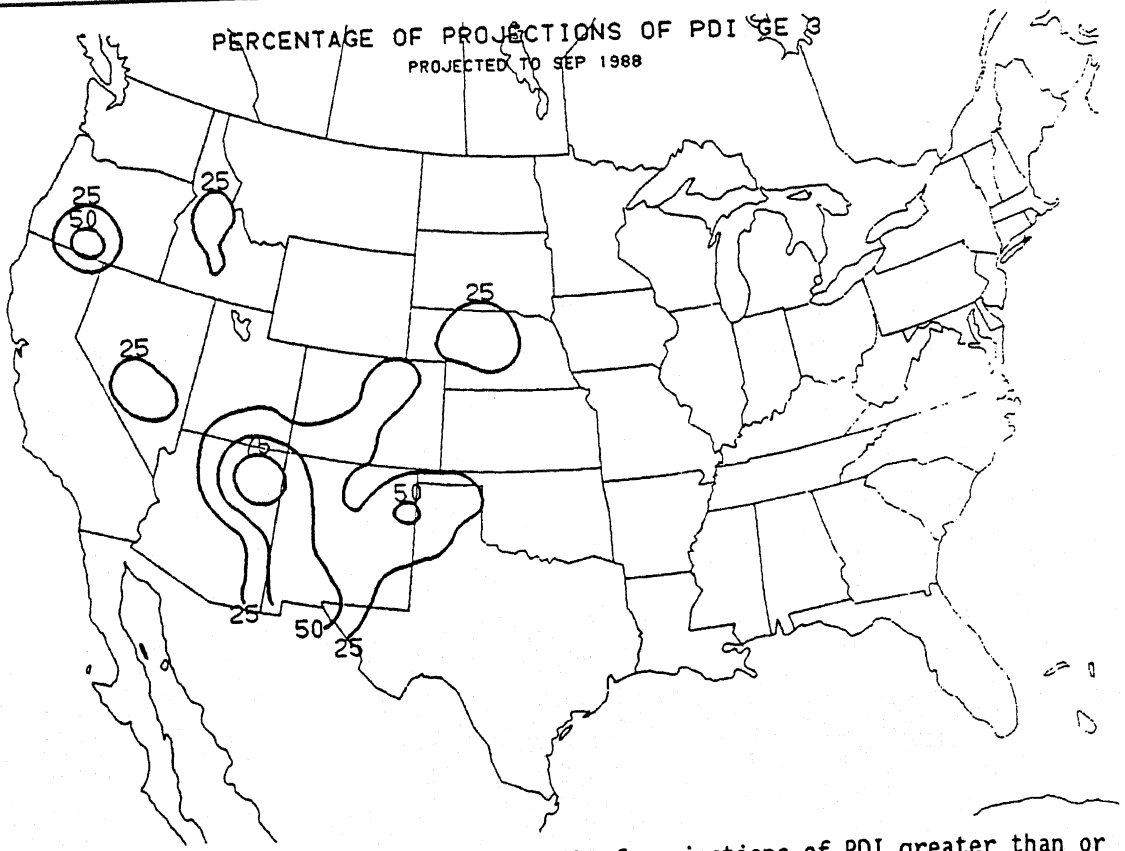

Figure 3. Percentage (contoured every 25%) of projections of PDI greater than or equal to +3.0 (projected to the end of September, 1988). Very moist spells are projected for only a few isolated sections of the Southwest and West.